APPLIED ECONOMICS

MARICOPA ASSOCIATION OF GOVERNMENTS
REGIONAL GROWING SMARTER IMPLEMENTATION:
WASTEWATER TREATMENT

FINAL REPORT

Prepared by:

Applied Economics
14682 N. 74th Street, Suite 100
Scottsdale, Arizona 85260

Prepared for:

Maricopa Association of Governments
302 North 1st Avenue, Suite 300
Phoenix, Arizona 85003

Reviewed by:

MAG Water Quality Advisory Committee

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1.0 INTRODUCTION

The purpose of the wastewater analysis is to provide a comprehensive look at future demand for treatment capacity in Maricopa County. As the county continues to grow, additional capital investment will be required in wastewater treatment infrastructure. This may be in the form of larger regional facilities, local facilities serving a particular city, or small package plants serving a particular development. This paper will highlight issues and challenges that will face the region, as well as local municipalities, relative to future wastewater generation and treatment capacity.

This paper utilizes information from the MAG 208 Water Quality Management Plan and wastewater provider interviews. These sources were used to compile an inventory of existing facilities and their respective capacities; project future wastewater generation by community; and identify where and when existing capacity may be exhausted between 2000 and build out. The analysis covers five points in time: 2000, 2010, 2025, 2040 and build out.

It is important to note that all wastewater treatment facilities in the MAG region must be in conformance with the MAG 208 Water Quality Management Plan. The MAG 208 Plan is the key guiding document used by Maricopa County and the Arizona Department of Environmental Quality in granting permits for wastewater treatment facilities in the MAG region. For information on facilities that have been approved and their respective capacities, please refer to the MAG 208 Water Quality Management Plan.

The paper is organized as follows. Section 2.0 provides an overview of the organizational structure of wastewater providers in the County detailing the owners and operators of current facilities including wastewater treatment plants and water reclamation facilities and their service areas. Section 3.0 details the current and projected capacity of these facilities and describes planned expansions. Section 4.0 presents the projections of future wastewater generation, which are based on projected population and employment growth in the MAG region. Finally, Section 5.0 compares the projected capacity with the projected wastewater generated to identify where and when new facilities will be needed.

2.0 ORGANIZATIONAL STRUCTURE AND EXISTING CAPACITY

The process of treating wastewater involves two different types of facilities: wastewater treatment plants (WWTP) and water reclamation facilities (WRF). Sometimes the water reclamation facility is the final destination for wastewater, and other times it is ultimately transferred to a wastewater treatment plant. Generally, water reclamation facilities process wastewater for use by golf courses, and for other similar landscaping uses. Currently in Maricopa County there are 22 wastewater treatment plants and 19 water reclamation facilities that process residential and commercial wastewater. Municipalities primarily operate these facilities, although there are a few privately owned facilities. A map of these facilities along with trunk lines for the metro area is shown on the following page.

Figure 1 lists the facilities that serve each community. There are three categories of operators shown in the table: municipal, multi-city sub-regional operating groups (SROG), and private companies. In some cases where the operator is a municipality, plants are operated by the community in which they are located; however in other cases a neighboring municipality operates them. Private companies are responsible for wastewater treatment in Carefree, Cave Creek, Youngtown and Litchfield Park. Additionally, private companies operate small package plants serving individual developments in Buckeye, Glendale, Peoria and in the unincorporated county.

In cases where a municipal facility is serving multiple communities, that facility is listed in the table more than once. However, the capacity listed is specific to each community. Capacities are in terms of millions of gallons per day. In most cases, Figure 1 excludes the MAG small plant inventory because it does not add sufficient additional capacity to be included in this macro-level analysis.

MAP 1
EXISTING AND FUTURE PUMP STATION, REUSE/RECHARGE, AND TREATMENT PLANT
LOCATIONS IN MARICOPA COUNTY

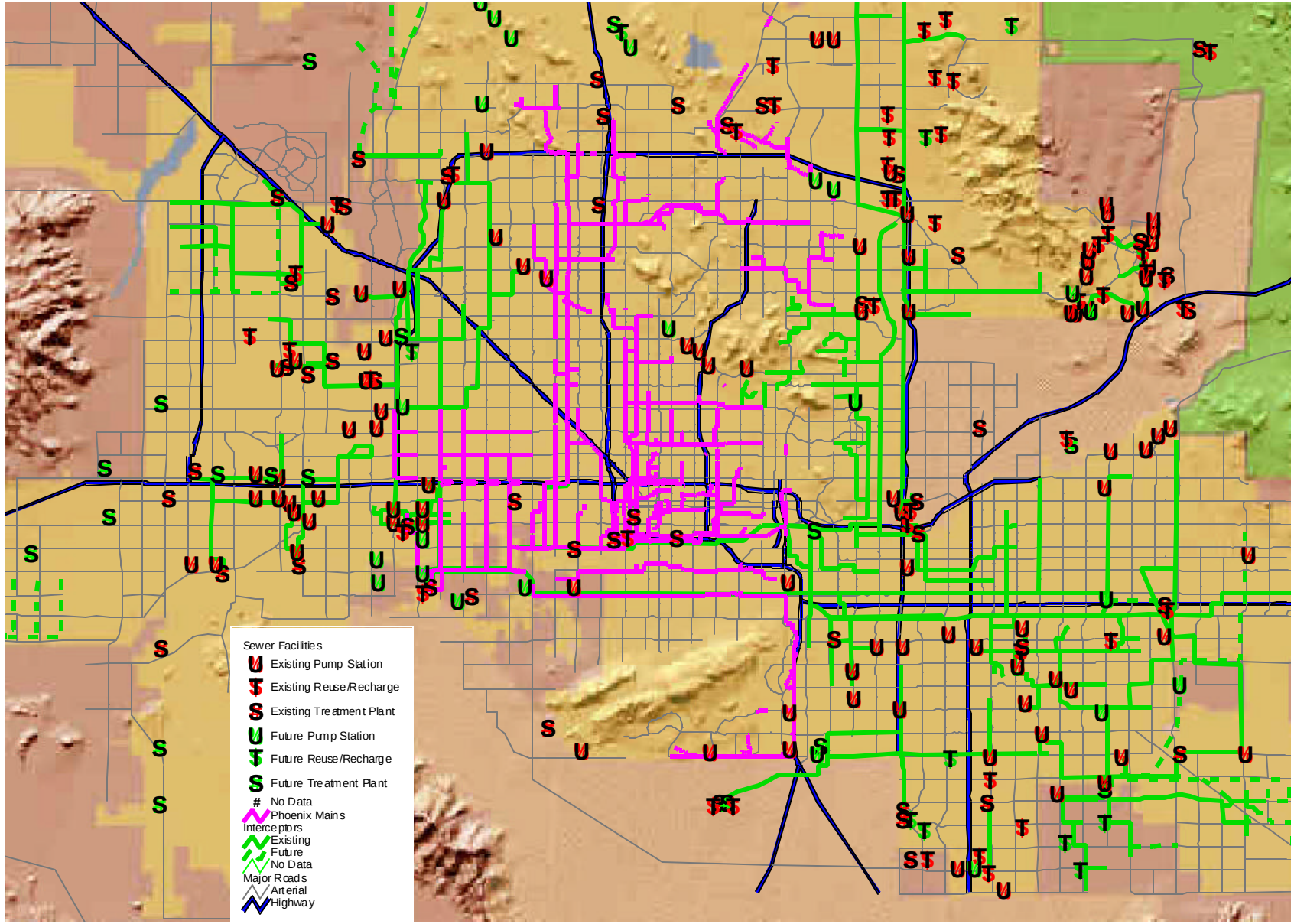


FIGURE 1
EXISTING AND PLANNED WASTEWATER FACILITIES

Community	Operator	Existing Facilities	Planned Facilities	Current Combined Capacity (mgd)	Ultimate Combined Capacity (mgd)
Avondale	City	Avondale WWTP	Avondale Package Plant, Northside WRF	6.40	27.00
Buckeye	City/Private (for package plants)	Buckeye WWTP	Sundance WWTP, Blue Horizons WWTP, Verrado WWTP	0.60	10.95
Carefree	Private	WWTP (Treatment agreement with Scottsdale for overflow only)	None - mostly septic	0.12	0.16
Cave Creek	Private	Rancho Manana WWTP	None - mostly septic	0.23	0.23
Chandler	City	Ocotillo WRF, Airport WRF, Lone Butte WRF, Industrial WWTP	None	28.10	41.30
El Mirage	City	El Mirage WWTP	None	3.60	3.60
Fort McDowell Yavapai*	Tribe	Casino WWTP	Bee Line Hwy WWTP	0.06	1.00
Fountain Hills	City	Fountain Hills WWTP	None	2.60	3.20
Gila Bend	City	Gila Bend WWTP	None	0.13	0.70
Gila River Indian Community	Tribe	Lone Butte WRF, Vee Quiva WWTP	Wild Horse WRP	2.30	12.30
Gilbert	City	Neely WRF	Mesa Gilbert South WRF	11.00	30.00
Glendale	City/Private (for package plants)	West Area WRF, Arrowhead Ranch WRF, 91st Ave WWTP, Desert Gardens WWTP, Casitas Bonitas WWTP	Arizona-AWC Russell Ranch WWTP, Desert Gardens II WWTP	22.10	33.75
Goodyear	City	157th Ave WWTP, Rainbow Valley WRF, Corgett Basin WRF	Palm Valley WRF, Gila River Basin-Cotton Lane WRF, Sarival WRF, Waterman Basin WRF	8.10	60.80
Guadalupe	City	91st Avenue WWTP (via Tempe)	None	0.70	0.70
Litchfield Park	Private	157th Ave WWTP	Sarival WRF, Palm Valley WRF	2.20	4.90
Mesa	Municipal/ SROG	91st Avenue WWTP, Northwest WRP, Southeast WRP	Mesa Gilbert South WRF	55.22	105.22
Paradise Valley	Municipal/ SROG	Treatment agreements with Phoenix and Scottsdale	None	1.80	1.80
Peoria	City/SROG/ Private (for package plants)	Tolleson WWTP, Beardsley WWTP, Pleasant Harbor WRP	South Peoria WRP, Quintero WRP, Saddleback WRP, Jomax WRF, Paddleford WWTP	12.46	54.24
Phoenix	Municipal/ SROG	91st Avenue WWTP, 23rd Avenue WWTP, Cave Creek WRP	North Gateway WRP	172.17	382.00
Queen Creek	Municipal	Southeast WRP	Mesa Gilbert South WRF	4.00	4.00
Salt River Pima Maricopa Community	Tribe	Northwest WRP, Roadrunner WWTP, Victory Acres WWTP	None	6.50	6.50
Scottsdale	Municipal/ SROG	Gainey Ranch WRP, Scottsdale Water Campus, 91st Avenue WWTP	None	26.83	46.00

FIGURE 1 (cont.)
EXISTING AND PLANNED WASTEWATER FACILITIES

Community	Operator	Existing Facilities	Planned Facilities	Current Combined Capacity (mgd)	Ultimate Combined Capacity (mgd)
Sun City*	Municipal	Tolleson WWTP	None	5.20	7.70
Surprise	Municipal	South Surprise WWTP, Litchfield Road WWTP	North Surprise WWTP	4.52	36.00
Tempe	Municipal/ SROG	Kyrene WRP, 91st Avenue WWTP	Rio Salado WRP	23.00	42.50
Tolleson	Municipal	Tolleson WWTP	None	2.90	4.20
Youngtown	Private	Tolleson WWTP	None	0.30	0.30
Wickenburg	Municipal	Wickenburg WWTP	None	0.80	1.20
Unincorporated County	Municipal/ Private	Anthem WWTP, Rio Verde WWTP, Sun City West, Sun Lakes, Wigwam Creek	Belmont WWTP, Lakeland Village WWTP, Mountainwood	7.74	24.41
TOTAL CAPACITY				**411.68**	**946.66**

* Not currently a MAG Member Agency.

There are four general categories of cities in terms of their approach to wastewater treatment.

- For small communities such as Carefree, Cave Creek and Paradise Valley, significant portions of the residents use septic tanks. This is also true in the Fort McDowell Yavapai Community and the Gila River Indian Community. In Carefree, the Black Mountain Sewer Corporation WWTP, which is privately owned, serves about 75 percent of the town and the remaining residents are on septic. In Cave Creek, the privately owned Rancho Manana package plant serves the downtown commercial area and the Rancho Manana Golf Club. The remainder of the town is on septic tanks. In Paradise Valley, residents that are not on septic (about 50 percent) rely on regional treatment plants in Phoenix and Scottsdale including 91st Avenue and 23rd Avenue, and Scottsdale's Water Campus.

- The second category of cities includes Avondale, Buckeye, El Mirage, Gilbert, Fountain Hills, Gila Bend and Wickenburg where a single wastewater treatment plant serves their community exclusively. Other communities including Sun City West, Sun Lakes, Rio Verde, Anthem and Wigwam Creek in the unincorporated county are similarly served by their own treatment plants. For outlying areas, this is a necessity since it would be cost prohibitive for them to connect to the regional wastewater transmission system. Queen Creek, another small outlying community, relies on the Southeast WRP in Mesa.

- The third category of cities includes communities such as Chandler, Surprise, Peoria and Goodyear and Litchfield Park where a combination of several plants serve sub-city planning areas within their community.

    - Chandler has three major treatment plants that serve the city including the Lone Butte, Ocotillo and Airport water reclamation facilities. The Gila River Indian Community uses a small part of the capacity at the Lone Butte facility.

    - Goodyear operates the 157th Avenue WWTP that also serves the residents of Litchfield Park through the Litchfield Park Service Company, a private utility company. The

Litchfield Park Service Company is planning to sell back their capacity to Goodyear and build two new water reclamation facilities.

- Although there are currently two WWTPs in Surprise, the Litchfield Road plant is currently operating only as a pump station to divert wastewater to the South Surprise WWTP. The Litchfield Road plant will close in 2002.

- Peoria has a WRP that serves the commercial development at Pleasant Harbor, and the Beardsley WWTP that serves the north central part of the City. Wastewater from the southern part of Peoria is sent to the Tolleson WWTP. Peoria and Tolleson form a Subregional Operating Group, the Peoria-Tolleson SROG.

- The fourth category of cities includes those that use large regional facilities. The 91st Avenue WWTP is the largest treatment plant in the county and is used jointly by five of the largest cities in the metro area that have formed the Subregional Operating Group (SROG) through a Joint Exercise of Powers Agreement. These communities include Phoenix, Mesa, Glendale, Scottsdale and Tempe. The City of Phoenix is the lead agency and actually operates the plant. Although all these cities rely heavily on the 91st Avenue facility, they also have other smaller reclamation and treatment facilities as noted below. Solids from these smaller local facilities are discharged for treatment at 91st Avenue.

  - Glendale, although it is a member of the SROG, also has several WRFs including the West Area and Arrowhead Ranch. The Arrowhead Ranch WRF serves that part of Glendale that is north of Union Hills Drive. The south part of Glendale is served by the 91st Avenue WWTP and the West Area WRF. Additionally there are several small package plants in Glendale such as Desert Gardens and Casitas Bonitas that serve individual multi-family complexes that are too far out to connect to the city system. Although Luke AFB is within the boundaries of the City of Glendale, it is self-sufficient in terms of wastewater treatment and is not included in this analysis.

  - Scottsdale, which is also a member of SROG, has its own Water Campus WRP along with the Gainey Ranch WRP, which serve parts of the City.

  - Tempe relies mainly on the 91st Avenue facilities, but wastewater from the southern part of the city goes to the Kyrene WRP.

  - Mesa primarily relies on its allotted capacity at the 91st Avenue WWTP. However, the city also operates the Northwest and Southeast WRPs that serve parts of Mesa.

  - Phoenix has two additional wastewater treatment facilities, 23rd Avenue and Cave Creek that serve large parts of the city that are not served by 91st Avenue. The 23rd Avenue plant serves most of the central city. The 91st Avenue plant serves north, south and parts of west Phoenix. The Cave Creek plant, which is relatively new and replaces two smaller development-specific plants, serves the part of Phoenix that is north of the CAP Aqueduct or Jomax Road.

- Tolleson also operates a smaller regional wastewater treatment plant that serves all residents and a large industrial user in Tolleson, as well as residents in other west side communities including Sun City, Youngtown (through Arizona-American Water Company) and part of Peoria.

In total, the County has a current (2002) capacity of 411.68 mgd, and a projected future capacity of 946.66 mgd. This capacity includes both wastewater treatment plants and water reclamation facilities. Additionally, it is important to note that in some communities many of the residents use septic systems and are not served by a municipal wastewater provider. Although it is unlikely that this will be the case for new developments, not all existing residents require wastewater service.

3.0 PROJECTED WASTEWATER CAPACITY

3.1 Projected Capacity

The first step in analyzing future regional wastewater conditions is to quantify current and projected capacity. Figure 2 shows a timeline of available capacity by facility in 2000, 2010, 2025, 2040 and at build out. Additional capacity in future years may come from expansions at existing plants or from construction of new facilities. The data in Figure 2 corresponds to the ultimate capacity shown in Figure 1, but includes details on individual plants and allocates supply additions to particular time frames.

FIGURE 2
CURRENT AND PROJECTED WASTEWATER TREATMENT CAPACITY

City	Facility	Capacity (mgd) 2000	2010	2025	2040	Buildout
Avondale						
	Avondale WWTP	3.5	6.4	6	20	20
	Northside WRP (Planned)	0	6	6	6	6
	Package WWTP (Planned)	0	0	0	1	1
Buckeye						
	Buckeye WWTP	0.6	2	2	2	2
	Sundance WWTP (Planned)	0	1.2	3.6	3.6	3.6
	Blue Horizons WWTP (Planned)	0	0.8	2	2	2
	Verrado WRF (Planned)	0	0.45	3.35	3.35	3.35
Carefree (Black Mountain Sewer Corporation)						
	BMSC WWTP	0.12	0.12	0.16	0.16	0.16
	BMSC Treatment Agreement with Scottsdale[1]	0.319	0.319	0.319	1	1
Cave Creek						
	Rancho Manana WWTP	0.23	0.23	0.23	0.23	0.23
Chandler		26.3	36.3	41.3	41.3	41.3
	Ocotillo WRF	10	10	10	10	10
	Airport WRF	5	15	20	20	20
	Industrial WWTP	2.8	2.8	2.8	2.8	2.8
	Lone Butte WWTP (GRIC)	8.5	8.5	8.5	8.5	8.5
El Mirage						
	El Mirage WWTP	0.25	3.6	3.6	3.6	3.6
Fort McDowell Yavapai Nation						
	Casino WWTP	0.06	0	0	0	0
	Bee Line Hwy WWTP (Planned)	0	0.25	1	1	1
Fountain Hills						
	Fountain Hills WWTP	1.9	3.2	3.2	3.2	3.2
Gila Bend						
	Gila Bend WWTP	0.13	0.13	0.7	0.7	0.7
GRIC						
	Lone Butte WWTP	2.2	2.2	2.2	2.2	2.2
	Wild Horse Pass WRP (Planned)	0	2	10	10	10
	Vee Quiva WWTP	0.1	0.1	0.1	0.1	0.1

[1] Maximum ultimate capacity of 1.0 would require additional payments to City of Scottsdale.

FIGURE 2 (Cont.)
CURRENT AND PROJECTED WASTEWATER TREATMENT CAPACITY

City	Facility	Capacity (mgd) 2000	2010	2025	2040	Buildout
Gilbert						
	Mesa Gilbert South WRF (Planned)	0	8	19	19	19
	Neely WRF	8.5	11	11	11	11
Glendale						
	West Area WRF	4.3	15	15	15	15
	Arrowhead Ranch WRF	4.5	4.5	4.5	4.5	4.5
	91st Ave WWTP	13.2	13.2	13.2	13.2	13.2
	Desert Gardens I WWTP	0.05	0.05	0.05	0.05	0.05
	Casitas Bonitas WWTP (will go to Sarival WRF)	0.05	0	0	0	0
	Desert Gardens II WWTP (Planned)	0	0	0.6	0.6	0.6
	AWC Russell Ranch WWTP (Planned)	0	0.06	0.4	0.4	0.4
Goodyear						
	Gila River Basin-Cotton Lane WRF (Planned)	0	0	0	4	4
	Palm Valley WRF (Planned)	0	8.2	8.2	8.2	8.2
	Sarival WRF (Planned)	0	8.2	8.2	8.2	8.2
	157th Ave Goodyear WWTP	3	11	15	15	15
	Rainbow Valley (Lum Basin) WRF (Planned)	0	4	9.2	9.2	9.2
	Waterman Basin WRF (Planned)	0	2.8	5.5	5.5	22
	Corgett Basin WRF	0.8	1.8	3	3	3
Guadalupe						
	91st Ave WWTP (via Tempe)	0.7	0.7	0.7	0.7	0.7
Litchfield Park- (Litchfield Park Service Company)						
	157th Ave WWTP	1.4	0	0	0	0
	Palm Valley WRF	0	0.8	8.2	8.2	8.2
	Sarival WRF (Planned)	0	4.1	8.2	8.2	8.2
Mesa						
	Mesa Gilbert South WRF (Planned)	0	3	24	24	30
	91st Ave WWTP	29.22	29.22	29.22	29.22	29.22
	Northwest WRP	18	18	18	30	30
	Southeast WRP	8	8	8	16	16
Paradise Valley						
	23rd Ave WWTP (treatment agreement w/Phoenix)	0.42	0.42	0.42	0.42	0.42
	91st Ave WWTP (treatment agreement w/Phoenix)	0.5	0.5	0.5	0.5	0.5
	Treatment agreement with Scottsdale	0.88	0.88	0.88	0.88	0.88
Peoria						
	Tolleson WWTP	9.4	9.4	13	13	13
	Beardsley WWTP	3	3	16	16	16
	South Peoria WRP (Planned)	0	2.8	2.8	13	13
	Jomax WRF (Planned)	0	6.7	6.7	9	9
	Quintero WRP (Planned)	0	0.07	0.07	0.07	0.15
	Paddleford WRP (Planned)	0	0	1	1	1
	Saddleback WRP (Planned)	0	0	0.9	0.9	0.9
	Pleasant Harbor WRP	0.063	0.063	0.189	0.189	0.189

FIGURE 2 (Cont.)
CURRENT AND PROJECTED WASTEWATER TREATMENT CAPACITY

City	Facility	Capacity (mgd) 2000	2010	2025	2040	Buildout
Phoenix						
	Cave Creek WRP	8	8	8	8	32
	North Gateway WRP (Planned)	0	4	32	32	32
	23rd Avenue WWTP	63	63	63	63	78
	91st Avenue WWTP	87.67	112.8	144.8	240	240
Queen Creek						
	Mesa Gilbert South WRF (Planned)	0	4	4	4	4
	Southeast WRP	4	0	0	0	0
SRPMIC						
	Northwest WRP	6	6	6	6	6
	Roadrunner WWTP	0.1	0.1	0.1	0.1	0.1
	Victory Acres WWTP	0.4	0.4	0.4	0.4	0.4
Scottsdale						
	Gainey Ranch WRP	1.7	1.7	1.7	1.7	1.7
	Scottsdale Water Campus WRP	12	16	24	24	24
	91st Ave WWTP	13.13	20.25	20.25	20.25	20.25
Sun City						
	Tolleson WWTP	5.2	5.2	7.7	7.7	7.7
Surprise						
	North Surprise WWTP (Planned)	0	na	na	na	na
	South Surprise WWTP	3.2	19.2	36	36	36
	Litchfield Road WWTP	1.32	0	0	0	0
Tempe (Use Phoenix)						
	Kyrene WRP	4.5	4.5	10	10	10
	91st Ave WWTP (plus alternative Rio Salado WRP)	18.53	29.03	32.5	32.5	32.5
Tolleson						
	Tolleson WWTP	2.9	2.9	4.2	4.2	4.2
Youngtown (Arizona-American Water Company)						
	Tolleson WWTP	0.3	0.3	0.3	0.3	0.3
Wickenburg						
	Wickenburg WWTP	0.8	1.2	1.2	1.2	1.2
Unincorporated Maricopa County						
	Anthem WWTP	0.5	0.5	4.5	4.5	4.5
	Belmont WWTP (Planned)	0	*4.5*	4.5	4.5	4.5
	Lakeland Village WWTP (Planned)	0	2.9	2.9	2.9	2.9
	Mountainwood (Planned-Use Gilbert)	0	0.37	0.37	0.37	0.37
	Rio Verde Area WWTP	0.3	0.6	0.9	0.9	0.9
	Sun City West	2.14	3.4	6.44	6.44	6.44
	Sun Lakes	2.4	2.4	2.4	2.4	2.4
	Wigwam Creek	2.4	2.4	2.4	2.4	2.4
REGIONAL TOTAL		**408.5**	**592.7**	**799.7**	**946.6**	**1,008.2**

The 2000 capacity of 408.5 mgd is projected to expand by 45 percent by 2010 to 592.7 mgd, and by an additional 35 percent by 2025 to 799.7 mgd, based on known improvements and ultimate facility capacities. The projected build out capacity of all existing and planned facilities is 1,008.2 mgd. The amount of time that it will take to use up this capacity will depend on the projected rate of population growth.

3.2 Expansion Strategies and Funding Sources

There are several different potential strategies regarding expansion. These include expansion of existing multi-city regional facilities and/or development of new regional facilities; development of a system of two to five plants within a specific community to serve sub-city planning areas; or construction of a larger number of small package plants serving individual developments. These package plants may or may not be incorporated into a future citywide system. Funding sources vary depending on whether the owner/operator is a public or private entity, although expansions are generally paid for through impact fees or increased user fees.

The following is a review of the information obtained from each wastewater provider. Note that in a few cases, it was not possible to interview providers directly, in which case the information presented here was taken directly from the MAG 208 Plan for 2002.[1]

Avondale. Avondale is currently in the process of expanding their existing treatment facility to 6.4 mgd. It will have an ultimate capacity of 20 mgd. They are also considering constructing an additional water reclamation plant with an ultimate capacity of 6 mgd that would serve the northern part of Avondale, north of I-10. Depending on the pace and density of future development, the city may also add a package plant with an ultimate capacity of 1 mgd that would serve the area south of the Gila River. Avondale will use bonds to pay for future expansion and construction. These bonds will be repaid through increased user fees.

Buckeye. Buckeye has one existing treatment facility that serves central Buckeye. There are plans to expand the plant in the next year from 0.6 mgd to 1 mgd. However, it is assumed that a portion of the existing developed area will remain on septic tanks. The Buckeye WWTP can be expanded to an ultimate capacity of 2 mgd, which should be adequate to serve the core community through 2015. There are three additional planned facilities that would serve specific developments. The Sundance and Blue Horizons plants will be located in the northern part of the core planning area and would be expanded as those developments grow to serve the build out population of that area. Blue Horizons WWTP is currently under construction. The Verrado WRF is planned to serve a future Verrado development, a large planned community near Tuthill and McDowell Roads. Additional large planned developments near the White Tanks such as Festival Ranch, Sun Valley, or Tartesso may also require their own treatment facilities, but no specific plans exist at this time. Because Buckeye is located some distance from the current urbanized area, they must plan carefully for future capacity needs because purchasing capacity from a plant in a neighboring city is not an option.

Carefree. No new construction is planned for Carefree, which is served by the Black Mountain Sewer Corporation. About 25 percent of residents will remain on septic tanks. The existing plant has a capacity of 0.12 mgd, which could be expanded to 0.16 mgd if needed. Currently, the City of Scottsdale will accept up to 318,951 gallons per day from the Black Mountain Sewer Corporation. With additional payments to the City of Scottsdale, Black Mountain could deliver up to 1 mgd to Scottsdale for treatment.

[1] Information for Youngtown, El Mirage and the Salt River Pima Maricopa tribe was taken directly from the MAG 208 Plan in lieu of interviews.

Cave Creek. No new construction or expansion is planned for Cave Creek. Future development will be low density and can rely on septic tanks. If needed, Cave Creek could rent capacity from the Black Mountain Sewer Corporation.

Chandler. Chandler has four facilities, including one dedicated industrial facility. Ocotillo WRF will remain at 10 mgd through buildout. The Airport WRF has a current capacity of 6.5 mgd and can be expanded to 20 mgd. Expansions are paid for through system development fees that are used to repay bonds. Chandler is likely to continue to operate their own facilities, rather than participate in a regional facility, because they are able to take advantage of gravity flow to the south and avoid the use of pump stations.

El Mirage. El Mirage has one treatment plant that serves the community. It is being expanded in phases, and the most recent expansion will be completed shortly, bringing the capacity to 3.6 mgd. The city has no plans to build additional facilities, as there is enough land available to continue to expand the existing facility. No specific future expansions are planned at this time. Expansions are paid for using revenue bonds that are paid back through user fees.

Fort McDowell Yavapai Nation. The Fort McDowell Nation will close their existing plant, which serves the Fort McDowell Casino, and open a replacement plant in 2002-2003. The new plant will serve both the casino and area residents who are currently on septic tanks. The new plant will have an ultimate capacity of 1 mgd, which is adequate for future needs.

Fountain Hills. Fountain Hills has one plant that serves the community plus a small portion of Scottsdale. There are two more expansion phases possible on the existing plant that will build out in 2007 at 3.2 mgd. There are no plans to site any additional facilities. Expansions to the existing plant will be paid for through connection fees.

Gila Bend. Gila Bend operates one treatment plant with a capacity of 0.13 mgd that serves local residents in this outlying area. Although there are no specific plans in place at this time, the plant can be expanded to 0.7 mgd, which should be adequate to serve the Town's build out population.

Gila River Indian Community (GRIC). The Gila River Community has two existing treatment plants and one planned facility. The Lone Butte WWTP is shared with the City of Chandler and cannot be expanded. The Vee Quiva plant and the Wild Horse Pass WRF, which is under construction, will serve the tribe's two casinos. The new Wild Horse Pass WRF will have an initial capacity of 2 mgd, but can be expanded to 10 mgd.

Gilbert. Gilbert currently relies on the Neely WRF, which will soon be expanded to its ultimate capacity of 11 mgd. The Mesa-Gilbert South WRF, which currently functions as a pump station, will be upgraded to a treatment facility by 2006, adding 8 mgd of new capacity with the ability to expand to 19 mgd. Wastewater expansions are paid for through bonding and user fees.

Glendale. Glendale has several wastewater treatment facilities that serve various parts of the City. Glendale uses the 91st Avenue regional plant with an allocated capacity of 13.2 mgd. Glendale's share of the 91st Avenue plant will not be increased, but the City could rent excess capacity from another SROG member if needed. The regional facility is very cost effective for Glendale. There are two WRFs currently operating to serve the West Area annexation and Arrowhead Ranch. There is no expansion planned for the Arrowhead Ranch facility, but the West Area WRF will be expanded to 15 mgd in 2007. Wastewater expansions in Glendale are paid for through bonding and user fees. There are several small WWTPs that serve individual developments that are outside the City's current service area, west of 115th Avenue. The Casitas Bonitas plant will eventually be shut down and the development will be connected

to the Sarival WRF in Goodyear. Desert Gardens I and II will however continue to operate until such a time as it is feasible for them to connect to the City of Glendale system.

Goodyear. Goodyear currently operates the 157th Avenue WWTP, and a small WRF in the Corgett Basin. The 157th Avenue plant can be expanded from its current capacity of 3 mgd to an ultimate capacity of 15 mgd. There are five planned WRFs that will increase the City's ultimate capacity to 69.9 mgd. The Palm Valley WRF, opening in 2002, will serve the area bounded by I-10, Camelback Road, Bullard Avenue and Dysart Road. The Sarival WRF, opening between 2004 and 2006, will serve the area bounded by I-10, Camelback Road, Bullard Avenue and Cotton Lane. The area south of the Gila River will be served by the Rainbow Valley, Waterman Basin and expanded Corgett Basin WRFs. Gila River Basin-Cotton Lane WRP is also planned for some time after 2025. Wastewater treatment expansions are primarily funded through impact fees.

Guadalupe. The Town of Guadalupe routes their wastewater to Tempe, which sends it to the 91st Avenue Plant. No expansions are anticipated since the Town is essentially built out.

Litchfield Park. The Litchfield Park Service Company serves Litchfield Park. They are selling back their capacity in the 157th Avenue WWTP to Goodyear. Future wastewater treatment for Litchfield Park will be provided at the planned Palm Valley WRF and the Sarival WRF, both of which also serve Goodyear.

Mesa. The largest share of wastewater from Mesa is currently treated at the 91st Avenue plant. Mesa's share of capacity at that regional facility is not projected to increase. The Northwest and Southeast WRPs, serving sections of the City will both be expanded around 2010 to 30 mgd and 16 mgd, respectively. Mesa is also developing a shared facility with Gilbert, the Mesa-Gilbert South WRF that will become operational as a treatment plant in 2006. The Mesa-Gilbert South WRF will continue to be expanded to meet the needs of new development up to an ultimate capacity of 30 mgd. Expansions to wastewater facilities in Mesa are paid for through bonding and user fees.

Paradise Valley. Residents of Paradise Valley have agreements to use treatment facilities in Phoenix and Scottsdale. Currently, the City of Scottsdale will accept up to 880,000 gallons per day from the Town of Paradise Valley. Additional capacity would require additional payments to the City of Scottsdale. The Town of Paradise Valley is largely built out, and it is likely that new development will mostly be served by septic tanks, due to the high cost of connecting to the sewer system.

Peoria. Peoria is currently served by the Beardsley WWTP, and by the WWTP in Tolleson. The Beardsley Plant can be expanded from its current capacity of 3 mgd to an ultimate capacity of 16 mgd. Two new water reclamation facilities are planned that will serve specific sub-areas of the city including the South Peoria WRP (serving south Peoria along with the Tolleson WWTP), and the Jomax WRF (serving northwest Peoria). Both will be expandable to meet future development needs. In addition, the City is allowing three large developments to build their own facilities. These facilities may be retired in the future, or they may be purchased by the City and continue to operate due to the hilly geography and the need for expensive pump stations to transfer wastewater to treatment plants in other parts of the city. Expansions and new facilities are paid for through a combination of user fees and impact fees.

Phoenix. Phoenix uses the 91st Avenue regional plant; along with the 23rd Avenue and Cave Creek plants, which both serve only Phoenix. All three of these facilities can be expanded. There is a planned North Gateway WRP that would come on line in 2005, and serve the area north of the CAP Aqueduct or Jomax Road. It will be expandable from an initial capacity of 4 mgd to an ultimate capacity of 32 mgd by 2032. Expansions are paid for through user fees.

Queen Creek. Queen Creek currently uses the Southeast WRP in Mesa, but will switch to the Mesa-Gilbert South WRF by 2010 when it becomes operational. No other expansions are planned.

Salt River Pima Maricopa Indian Community. The commercial development on the reservation is primarily served by the Northwest WRP in Mesa. There are also two small package plants that serve the Pavilions shopping center and other commercial areas. These package plants will be retired in the future and connected to the Pima Road Interceptor. No other expansions are planned as the majority of residential development is served by septic tanks.

Scottsdale. Scottsdale is a participant in the 91st Avenue treatment plant, plus the city operates two local WRPs. The Scottsdale Water Campus can be expanded from a current capacity of 12 mgd to an ultimate capacity of 24 mgd. The initial expansion to 16 mgd will take place by 2005. Scottsdale will also be expanding their capacity at the 91st Avenue plant by 2005. The Gainey Ranch WRP in Scottsdale will not be expanded, but will be maintained as a permanent facility. Expansions are paid for through impact fees.

Sun City. The Tolleson WWTP serves Sun City. A small expansion from the current capacity of 5.2 mgd to an ultimate capacity of 7.7 mgd is planned beyond 2010.

Surprise. The City of Surprise has two WWTPs serving the community. The Litchfield Road plant will be shut down and flows will be diverted to the South Surprise plant beginning in 2002. The South Surprise plant will be expanded in phases to a capacity of 36 mgd. The City has plans to develop a new WWTP to serve development in the north part of the city that will become operational in 2005. The exact capacity of that plant is not known at this time. In the interim, temporary package plants may be required to serve new development. Such plants would be required to go through the appropriate process to be added to the MAG 208 Plan.

Tempe. Tempe relies mainly on the 91st Avenue WWTP. The City will continue to renegotiate for additional capacity in the regional facility. There is also the Kyrene WRP that serves South Tempe and will be expanded beginning in 2005, to an ultimate capacity of 10 mgd. There are plans for an additional facility, the Rio Salado WRF, with a capacity of 11 mgd, but the need for this facility will depend on the City's ability to expand its share at 91st Avenue. Expansions are paid for through user fees.

Tolleson. Tolleson is served by a local WWTP that also serves Sun City, Youngtown and part of Peoria. Tolleson has plans to expand their facility to meet the needs of these other communities. However, the City's own share of capacity will only increase from 2.9 mgd to 4.2 mgd, sometime beyond 2010. Expansions are paid for through user fees.

Youngtown. Youngtown relies on the Tolleson WWTP. No need for additional capacity is anticipated at this time.

Wickenburg. Wickenburg, an outlying community, has its own wastewater treatment facility. It will be expanding next year to a capacity of 1.2 mgd. Much of the existing residential development has septic tanks. Any large new master planned developments in the area would need to provide their own treatment facilities.

Unincorporated Maricopa County. There are several planned facilities in the unincorporated county that will serve large new developments including Belmont and Lakeland Village. Expansions are also planned for the facilities serving Anthem, Sun City West and Rio Verde.

4.0 PROJECTED WASTEWATER GENERATION

The projected demand for wastewater treatment capacity is essentially the amount of wastewater that will be generated by future population and employment. The projections cover five points in time including 2000, 2010, 2025, 2040 and build out. This analysis is limited to residential and commercial/industrial wastewater.

4.1 Wastewater Generation Rates

Wastewater generation rates are based on data from local jurisdictions as documented in the 208 Plan. Both residential and commercial/industrial use are included in the per capita per day generation rates. In some cases there are additional flows included to account for specific non-residential users. The basic residential generation rate is assumed to be 100 gallons per capita per day, although there are variations among local municipalities (Figure 3). In most cases the rates are held constant over time unless specific information about increases or decreases in the per capita rate was available from the 208 Plan.

Note that in all three of the Indian communities there are specific additions to the per capita per day flows to account for wastewater from the casinos. The additions in Tolleson reflect one large industrial user that has a disproportionate impact on the wastewater system of this relatively small community. The additions in Scottsdale reflect intergovernmental agreements to treat a specific amounts of wastewater for Boulders-Carefree and the Town of Paradise Valley.

FIGURE 3
WASTEWATER GENERATION RATES
BY MUNICIPALITY

	Gallons per Capita per Day	Additional Flows
Avondale	100	
Buckeye	100	
Carefree[1]	120	
Cave Creek	100	
Chandler[2]	96	
El Mirage	88	
Fountain Hills	90 gpcd in 2000, decreasing to 58 gpcd in 2020	
Ft. McDowell Yavapai Nation	100	60,000 gpd from casino
Gila Bend [3]	100	
Gilbert	80	
Glendale	97	
Goodyear	100	
GRIC	0	Casino flows
Guadalupe	100	
Litchfield Park	100	
Mesa	112.5	
Maricopa County	100	
Paradise Valley [4]	230	
Peoria	100	
Phoenix	105.5	
Queen Creek	100	
Scottsdale	114	1.88 mgd
SRPMIC	62	3.85 mgd
Surprise	100	
Tempe	132 gpcd in 2000, increasing to 184 gpcd in 2020	
Tolleson	100	0.7 mgd in 2000, increasing to 3.22 mgd in 2020
Wickenburg [5]	100	
Youngtown	90	

Source: MAG 208 Water Quality Management Plan, February 2002.

[1] Assume 75 percent of planning area population served by sewer.

[2] Use 90 gpcd for 2000 and 96 gpcd for future years.

[3] Assume 90 percent of planning area population served by sewer.

[4] Assume constant unsewered population of 7,313.

[5] Assume 59 percent of planning area served in 2000, increasing to 66 percent by 2020.

4.2 Projected Population

Existing generation rates shown above were applied to the most current MAG population projections.[2] Modifications were made to the projections based on comments from certain communities as noted in the sources. The projections by MPA for the relevant time periods are shown in Figure 4. Note that data for 2025 was interpolated since the projections are in 10-year increments. Population for 2025 was estimated as the mid-point between 2020 and 2030.

FIGURE 4
PROJECTED POPULATION BY MPA

City	2000	2010	2025	2040	Buildout
Avondale	37,800	71,100	108,950	114,800	115,000
Buckeye	16,700	76,600	328,150	586,800	837,900
Carefree	3,000	4,100	4,950	5,000	5,100
Cave Creek	3,900	5,200	9,450	13,300	13,300
Chandler	185,300	260,400	286,600	289,900	291,800
El Mirage	8,700	34,700	47,950	51,400	51,400
Fountain Hills	20,500	24,800	31,050	31,500	31,800
Gila Bend	2,300	2,900	12,000	65,200	122,400
Gila River	2,700	3,200	4,700	9,500	9,600
Gilbert	114,300	211,700	282,050	287,800	311,700
Glendale	230,300	294,900	310,300	313,400	315,200
Goodyear	21,200	66,600	248,650	366,200	373,800
Guadalupe	5,200	5,200	5,200	5,300	5,300
Litchfield Park	3,800	8,800	14,350	14,800	15,000
Mesa	441,800	535,200	632,050	649,000	651,300
Maricopa County	85,300	91,700	149,500	615,500	1,343,900
Paradise Valley	14,100	15,200	15,900	16,200	16,300
Peoria	114,100	165,600	300,000	383,500	391,800
Phoenix	1,350,500	1,700,800	2,093,500	2,261,100	2,290,600
Queen Creek	8,900	19,400	84,550	93,600	94,000
Salt River	6,500	7,400	7,500	7,500	7,600
Scottsdale	204,300	261,500	297,500	301,600	304,500
Surprise	37,700	119,400	278,050	644,400	677,600
Tempe	158,900	175,500	183,150	187,200	188,400
Tolleson	5,000	6,200	6,300	6,400	6,400
Wickenburg	7,400	7,700	14,400	33,200	33,500
Youngtown	3,000	5,600	6,800	7,300	7,400
Total*	**3,093,200**	**4,181,400**	**5,763,550**	**7,361,400**	**8,512,600**

Source: Maricopa Association of Governments Draft 2 Projections, 2002; Town of Gilbert.

* Includes Pinal County portion of Queen Creek and Yavapai County portion of Peoria.

In some cases the projections for ultimate build out are substantially higher than the 2040 projections, such as in unincorporated Maricopa County, and Gila Bend. Ultimate build out is based on the total

[2] The City of Phoenix wishes to note that, in the past, some MAG population projections have underestimated actual population outcomes.

carrying capacity of the land using known future land use designations. It is entirely possible that ultimate build out may never occur, especially in the unincorporated county.

The average annual growth rate from 2000 to 2010 is highest in West Valley communities that are just now beginning to experience rapid growth. These include Buckeye, Surprise, Goodyear and El Mirage. Buckeye has an astounding estimated annual growth rate of 36 percent over the next ten years. El Mirage is projected to grow by 30 percent per year, and Surprise and Goodyear are project to grow by 21 percent per year through 2010. Neighboring Litchfield Park is projected to grow at 13 percent per year. The only other community with an annual growth rate over 10 percent is Queen Creek, although very rapid growth in this outlying East Valley community is not projected to occur until after 2010. The remaining 20 communities in Maricopa County are projected to grow at an annual average rate of 2.9 percent from 2000 to 2010.

In the period from 2010 to 2025, Buckeye and Goodyear are projected to continue to grow at very rapid rates of 22 and 18 percent, respectively. Considering that the population base in these communities will be 250,000 to 300,000 by 2010, these are amazingly high growth rates. Queen Creek is also projected to boom in the 2010 to 2025 period with an average annual growth rate of 22 percent. The other rapidly growing community during this time period is Gila Bend with a growth rate of 21 percent, but a population base of less than 3,000. The remaining communities are projected to grow at an annual average rate of 3.1 percent from 2010 to 2025, up slightly from the previous period.

From 2025 to 2040, the only areas that are projected to have growth rates in excess of 20 percent per year are Gila Bend and unincorporated Maricopa County. The remaining communities are projected to grow at an annual average rate of 1.7 from 2024 to 2040. This only about half the growth rate from the previous period due to the larger population base and the reduced amount of developable land remaining.

From 2040 to build out, annual growth rates in most communities are projected at less than 1 percent as infill development slowly uses up all developable land. The exceptions are Gila Bend, unincorporated Maricopa County and Buckeye, which are projected to grow between 4 and 12 percent per year.

4.3 Projected Wastewater Generation

The next step is to apply the population projections to the wastewater generation rates. The results are shown in Figure 5. Generally, the amount of wastewater generation corresponds closely to total population and population growth rates by community.

FIGURE 5
PROJECTED WASTEWATER GENERATION BY MPA
MILLIONS OF GALLONS PER DAY

City	2000	2010	2025	2040	Buildout
Avondale	3.78	7.11	10.90	11.48	11.50
Buckeye	1.67	7.66	32.82	58.68	83.79
Carefree	0.27	0.37	0.45	0.45	0.46
Cave Creek	0.39	0.52	0.95	1.33	1.33
Chandler	16.00	25.00	27.51	27.83	28.01
El Mirage	0.77	3.05	4.22	4.52	4.52
Fountain Hills	1.85	2.23	1.80	1.83	1.84
Gila Bend	0.21	0.26	1.08	5.87	11.02
Gila River	0.10	2.10	10.10	10.10	10.10
Gilbert	9.14	16.94	22.56	23.02	24.94
Glendale	22.34	28.61	30.10	30.40	30.57
Goodyear	2.12	6.66	24.87	36.62	37.38
Guadalupe	0.52	0.52	0.52	0.53	0.53
Litchfield Park	0.38	0.88	1.44	1.48	1.50
Mesa	49.70	60.21	71.11	73.01	73.27
Maricopa County	8.59	9.23	15.01	61.61	134.45
Paradise Valley	1.56	1.81	1.98	2.04	2.07
Peoria	11.41	16.56	30.00	38.35	39.18
Phoenix	142.48	179.43	220.86	238.55	241.66
Queen Creek	0.89	1.94	8.46	9.36	9.40
Salt River	4.25	4.31	4.32	4.32	4.32
Scottsdale	25.17	31.69	35.80	36.26	36.59
Surprise	3.77	11.94	27.81	64.44	67.76
Tempe	20.97	23.17	33.70	34.44	34.67
Tolleson	1.20	1.32	3.85	3.86	3.86
Wickenburg	0.44	0.45	0.95	2.19	2.21
Youngtown	0.27	0.50	0.61	0.66	0.67
Total	**330.24**	**444.48**	**623.73**	**783.24**	**897.60**

Source: Maricopa Association of Governments Draft 2 Projections, 2002; Applied Economics, 2002.

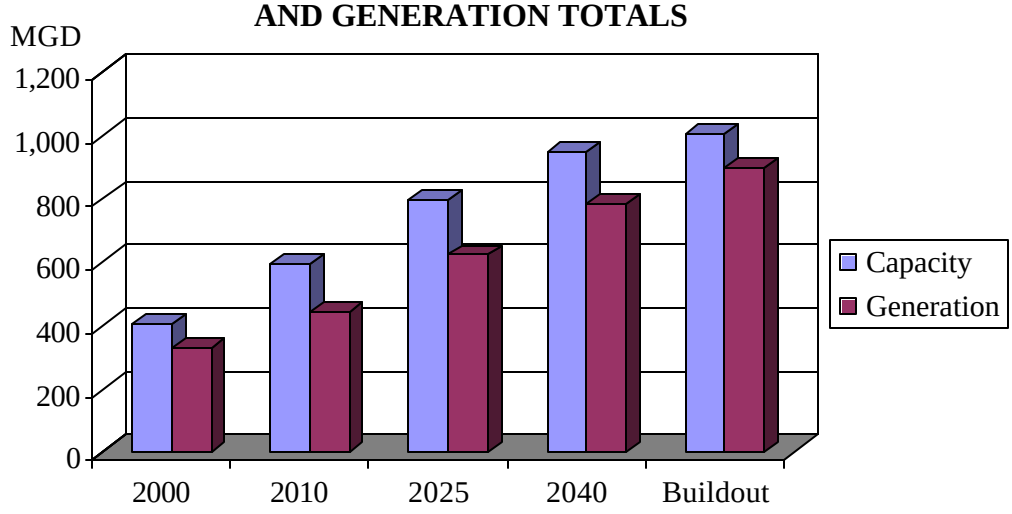
5.0 ANALYSIS OF CAPACITY REQUIREMENTS

The purpose of the capacity requirements analysis is to compare projected wastewater generation with treatment capacity in each of the five time periods included in this analysis.

5.1 Regional Net Capacity

On a regional basis, projected treatment capacity exceeds wastewater generation in all five time periods (Figure 6). In 2010 and 2025, capacity exceeds generation by 28 to 33 percent. In 2040, excess capacity is reduced to 21 percent of total regional generation, and by build out, excess capacity is estimated at 12 percent. Even at 12 percent excess capacity, it appears that as a region Maricopa County does not have long-term infrastructure constraints in terms of wastewater treatment. However, at the local level there are additional capacity needs in some communities in all of the time periods.

FIGURE 6
REGIONAL PROJECTED WASTEWATER CAPACITY AND GENERATION TOTALS



5.2 Local Net Capacity

Net capacity (treatment capacity less wastewater generation) at the community level is shown in Figure 7. Note that these are simply order of magnitude estimates and very small additional capacity needs are not of great concern.

FIGURE 7
PROJECTED NET CAPACITY BY MPA*
MILLIONS OF GALLONS PER DAY

City	2000	2010	2025	2040	Buildout
Avondale	(0.28)	5.29	1.51	15.52	15.50
Buckeye	(1.07)	(3.21)	(21.87)	(47.73)	(72.84)
Carefree	0.17	0.07	0.03	0.71	0.70
Cave Creek	(0.16)	(0.29)	(0.71)	(1.10)	(1.10)
Chandler	10.30	11.30	13.79	13.47	13.29
El Mirage	(0.52)	0.55	(0.62)	(0.92)	(0.92)
Fountain Hills	0.05	0.97	1.40	1.37	1.36
Gila Bend	(0.08)	(0.13)	(0.38)	(5.17)	(10.32)
Gila River	2.20	2.20	2.20	2.20	2.20
Gilbert	(0.64)	2.06	7.44	6.98	5.06
Glendale	(0.24)	4.20	3.65	3.35	3.18
Goodyear	1.68	29.34	24.24	16.48	32.22
Guadalupe	0.18	0.18	0.18	0.17	0.17
Litchfield Park	1.02	4.02	14.97	14.92	14.90
Mesa	5.52	(1.99)	8.11	26.21	31.95
Maricopa County**	4.41	13.29	18.10	(28.50)	(101.34)
Paradise Valley	0.24	(0.01)	(0.18)	(0.24)	(0.27)
Peoria	1.05	5.47	10.66	14.81	14.06
Phoenix	16.19	8.37	26.94	104.45	140.34
Queen Creek	3.11	2.06	(4.46)	(5.36)	(5.40)
Salt River	2.25	2.19	2.19	2.19	2.18
Scottsdale	1.66	6.26	10.16	9.69	9.36
Surprise	0.75	7.26	8.20	(28.44)	(31.76)
Tempe	2.06	10.36	8.80	8.06	7.83
Tolleson	1.70	1.58	0.35	0.34	0.34
Wickenburg	0.36	0.75	0.25	(0.99)	(1.01)
Youngtown	0.03	(0.20)	(0.31)	(0.36)	(0.37)
Total	**51.95**	**111.94**	**134.62**	**122.10**	**69.31**

Source: Maricopa Association of Governments Draft 2 Projections, 2002.
*Net capacity = Total Capacity - Projected Generation
**Includes Sun City and Fort McDowell Yavapai Nation.

Additional capacity needs are projected in all time periods in Buckeye. By 2040, generation will exceed capacity by 47.73 million gallons per day and by build out the generation will exceed capacity by an estimated 72.84 mgd. To put this in perspective, the Town's current capacity is only 0.6 mgd. Buckeye has a number of very large master planned communities slated for future development. The existing plant, which can be expanded to 2 mgd, serves only the core population in the developed portion of the community. The Town is aware of the impending additional capacity needs and is planning to negotiate agreements with developers for package plants as these large master plans are approved. There are currently plans in place with three large developments for additional treatment plants. The estimated cost to build 72.84 mgd of additional capacity is $1.2 billion, including the collection system, treatment and effluent disposal. However, some of this cost would likely be born by developers. In the shorter term, the cost to build capacity required by 2010 is estimated at $53.0 million.

Cave Creek also has small additional capacity needs in all time periods. The current system for the portion of the town that is served by a wastewater system is 0.23 mgd and no expansions are projected. However, given the increasing capacity needs, expansions will likely be necessary before 2010. The estimated cost to meet the capacity requirements for 2010 would be $4.7 million. A total investment of $18.1 million would be required to service the projected build out population in Cave Creek.

Gila Bend is another small community with additional capacity needs increasing from 0.13 mgd in 2010 to 10.32 mgd by build out. The current capacity of Gila Bend's system is 0.13 mgd with an expansion to 0.7 mgd planned in 2020. This expansion may need to be accelerated if population growth keeps up with MAG projections. Given Gila Bend's remote location, purchasing capacity from a neighboring community is not an option. The total estimated infrastructure investment required by 2010 is estimated at $2.2 million. At build out, the cost to provide 10.32 mgd additional capacity would be $170.2 million, including the planned expansion from 0.13 mgd to 0.7 mgd.

El Mirage is projected to have additional capacity needs of 0.62 mgd by 2025, increasing to 0.92 mgd by 2040. The El Mirage WWTP has a planned expansion that will provide excess capacity in 2010, but long-term population growth will exceed the capacity of that plant. Given the magnitude of the additional capacity needs (less than 1 mgd), it may be possible that the existing treatment plant could be further expanded from its planned capacity of 3.6 mgd to meet additional demand. The total cost of the additional 0.92 mgd required to meet demand by 2040 is estimated at $15.2 million.

Paradise Valley has small additional capacity needs beginning in the 2010 time period. By 2040, the additional needed capacity is projected at 0.24 mgd. Although the town is nearly built out now, the high price of land is fueling redevelopment activity. In some cases, older homes on large multi-acre lots are being redeveloped into multiple homes on smaller one acre lots, thereby increasing the amount of wastewater generation. However, since Paradise Valley relies on the regional treatment facility for residents who are not on septic, it would be possible to negotiate agreements with the City of Phoenix for additional flow capacity from the 23rd Avenue or 91st Avenue plants.

Mesa has a small additional capacity need of 1.99 mgd in 2010, but excess capacity in all other time periods. It is likely that this is simply a timing issue. The Mesa Gilbert South WRF is projected to come on-line in 2006 with a capacity of 3 mgd allocated to Mesa, increasing to 24 mgd by 2025. The Town of Gilbert will use 8 mgd of capacity at the new Mesa Gilbert South facility in 2006, which would give Gilbert excess capacity in 2010 that could possibly be re-allocated to Mesa.

Queen Creek is expected to experience additional capacity needs by the 2025 time period when their growth rate peaks. No expansions in capacity are planned at this time beyond the 4 mgd they plan to purchase from the Mesa-Gilbert South WRF this year. However, since Mesa has excess capacity in 2025 and 2040, it is likely that Queen Creek could purchase additional capacity as needed to meet long term increases in demand.

Despite rapid growth in the 2000 to 2010 period, Surprise is able to maintain excess capacity until 2040 based on planned expansions at the South Surprise WWTP. No capacity data was available for the planned North Surprise WWTP that will come on-line in 2005. The city will likely be able to cover the projected additional capacity needs of 31.76 mgd that is projected by build out with this additional planned treatment facility. The estimated capital cost of building treatment capacity of 31.76 mgd would be $524.0 million.

Wickenburg is expected to have small additional capacity needs of just less than 1 mgd, should they reach their projected population level of 33,200 by 2040. Given the remote location, Wickenburg does not have the option of purchasing capacity from another community. However, it is likely they could negotiate

with developers for additional package plants to meet the small additional capacity needs in long-term capacity. The estimated cost of adding 1.01 mgd in treatment capacity required by build out is $16.7 million. It is assumed this cost would be largely born by developers, either directly or through impact fees.

The small community of Youngtown is projected to experience additional capacity needs by 2010, despite relatively slow growth. They currently utilize 0.3 mgd at the Tolleson WWTP with no projected increases. Tolleson has a small amount of excess capacity that could possibly be re-allocated to Youngtown.

Unincorporated Maricopa County is projected to experience sizeable long-term additional capacity needs of 28.50 mgd by 2040 when population is projected at 615,500. A dramatic 312 percent increase in population in the unincorporated county is projected between 2025 and 2040. Since it is unclear where the specific geographic location of this additional needed capacity would be, it is also unclear where additional capacity would come from. However, the some of the excess capacity at the regional level in 2040 could potentially be re-allocated to the appropriate locations. Alternatively, developers in the unincorporated county could be required to provide package plants, which is generally consistent with the way the County has handled wastewater treatment up to this point. The estimated cost to build the 28.5 mgd of additional capacity required by 2040 would be $470.3 million, and an additional $1.2 billion investment would be required to meet build out demands.

The only other major discrepancy is the substantial excess capacity that is projected for the City of Phoenix by 2040. A planned expansion at the 91st Avenue WWTP between 2025 and 2040 would boost the city's capacity from 248 mgd to 343 mgd, resulting in a projected surplus of 104.45 mgd by 2040. According to the City of Phoenix, projections used in this report for the years 2020 to build out under project the historic growth experienced in wastewater generation and show more excess capacity than expected.

5.3 Conclusions

Overall, it appears that significant additional capacity needs in treatment capacity are isolated to rapidly growing communities on the urban periphery. However, some of these additional capacity needs are projected to occur in the near term, by 2010. In some cases it is possible to re-allocate capacity from regional facilities in neighboring communities such as in Queen Creek, Paradise Valley, Mesa and Youngtown.

In other cases such as Cave Creek and El Mirage where there are smaller additional capacity needs, but the communities are not served by regional facilities, expansion plans may need to be revised to accommodate slightly higher than anticipated growth rates.

When projected additional capacity needs are large and it is not possible to re-allocate capacity from regional treatment facilities, such as in Buckeye and Gila Bend, these communities will face substantial challenges in working with developers to ensure that the treatment needs of the rapidly growing resident base can be met. Given the magnitude of the additional capacity needs in Buckeye, it will also be a challenge for Buckeye to avoid ending up with an unmanageable number of small package plants rather than a more comprehensive citywide system. The unincorporated county may face a similar challenge depending on the geographic distribution of growth and corresponding additional capacity needs.